RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, MARCH 2022

SECOND YEAR [BATCH 2020-23]

Date : 09/03/2022

ELECTRONICS (GENERAL)

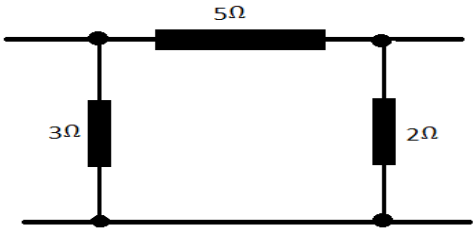
Time : 11 am – 1 pm

PAPER : III

Full Marks : 50

Answer **any five** questions of the following: [5×10]

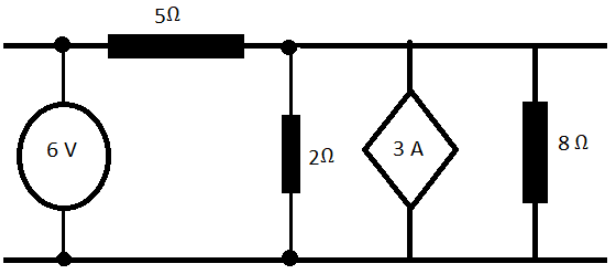
1. a) Convert the pi network to Y network of the following circuit.



b) Write short note on (i) self and mutual inductance. (ii) Step up and step down transformer. (4+6)

2. Take a series LCR circuit with a sinusoidal source flowing current ($i = i_0 \sin 2\pi f t$). (a) Write the equivalent impedance of the circuit. (b) Draw phase diagram of each component. (c) Explain how total impedance and current will change with the source frequency in the circuit. (d) What is the power and quality factors in the circuit? (e) How did you achieve resonance in it? (2+2+2+2+2)

3. a) Solve the following circuit



Find voltage drop on each resistance and current through 8Ω.

b) Using circuits explain Thevenin's and Norton's theorem. (5+5)

4. a) Write mechanism and characteristics (I-V) of a FET. What is pinch-off voltage?

b) How many types (in general) of MOSFET are there? Explain any one type. What is the significant to use SiO_2 in MOSFET (5+5)

5. a) Why feedback is needed in amplifiers?

b) Obtain an expression on feedback amplifiers.

c) Using block diagram and phase factor explain positive and negative feedback.

d) Why feedback is needed for a oscillator (2+3+4+1)

6. a) Draw a single stage CE configuration n-p-n transistor circuit.
   b) Derive all h-parameters for the circuit.
   c) Draw the π model of the circuit.
   d) Apply V_s (voltage source) and R_s (source resistance) in the input of the π model of the circuit and find current gain, voltage gain, input and output impedance. (1.5+2.5+2+4)

7. a) Explain full wave rectifier circuit.
   b) Significant of π filter in it.
   c) Explain with circuit diagram Class A, Class B and Class AB (2+2+6)

8. Write short note on the following:
   a) Avalanche breakdown
   b) Reverse saturation current
   c) Load line and Quiescent (Q) point
   d) Depletion layer (2.5+2.5+2.5+2.5)

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